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Description of a new subspecies of *Pieris shangrilla* (Lepidoptera, Pieridae) from Sichuan Province, China

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Abstract A new subspecies of *Pieris shangrilla*, *P. shangrilla koidesia* **ssp. nov.**, from Sichuan Province of China is described and illustrated.

Key words *Pieris shangrilla*, Systematic, Taxonomy.

Introduction

Soon after the description of a new species *Pieris shangrilla* Tadokoro, Shinkawa & Wang 2013 from N-Yunnan in China, we found further three specimens of *P. shangrilla* from Sichuan Province, in the collection of Mr Yuichi Koide. It was apparent that those specimens were not **P. davidis* Oberthür 1876 or its related taxa but represent *P. shangrilla* (Figs 2, 3), judging from its distinct morphological characteristics stated in Tadokoro *et al.* (2013). Later, we found nine more male specimens in our own collection, which showed exactly the same morphological characteristics as Koide's ones. In this paper, a new subspecies of *P. shangrilla* is described on the newly found materials from Sichuan Province in China after detailed observation of the wing markings, androconia and male genitalia.

Materials and Methods

Specimens of the new subspecies (Figs 1, 3) collected in Sichuan province in China in mid June 1988, 1996, 2004 and 2005 respectively, and those of the nominotypical subspecies of *Pieris shangrila* (Figs 2, 3) from N-Yunnan were examined. Androconia scales were removed from the male forewing upperside cell and observed by optical microscope at 400 magnifications. Male genitalia were dissected and observed by stereomicroscope at 20 magnifications after removing skins and muscle by 20% KOH solution. The holotype specimen of the new subspecies will be deposited in the collections of South China Agricultural University, Guangzhou, and paratype specimens will be deposited in the University Museum of the University of Tokyo, Museo Civico di Storia Naturale in Milan and NHM in London.

Description

Pieris shangrilla koidesia Tadokoro, Wang and Bozano, **ssp. nov.** (Fig. 1)

Holotype ♂, Tianquan-xian, Sichuan Prov., China (alt. 2,000 m). 14 VI, 2005; Paratypes 2♂, same labels as holotype; Paratypes 1♂, Jiuzhaigou, Sichuan Prov. (alt. 2,800 m). 18 VI, 2004; 2♂, Jiuzhaigou (alt. 2,200–2,60 0m). 24 VI, 1996; 5♂, Pingwu-Nanping, Sichuan Prov. (alt. 1,700–2,800 m). 21 VI, 1996; 1♂, Jiuzhaigou (alt. 2,500 m). 24 VI, 1988

Wing expanse 48–54 mm (Forewing length 25.5–30 mm) for males

Wing markings (male): Wings white with the venation blackish. Basal area of upperside black. Submarginal band on the forewings very faint. No apical markings on the hindwing spaces 6 and 7. Forewing underside white, with apex pale yellow. Ground color of hindwing underside pale yellow. Only basal part of space 8 vivid yellow. Black streak running from base in the cell of hindwing underside, branching into two streaks, which become thinner and often disappearing distally.

Androconia (Fig. 4): Typically pyriform as in other *Pieris* species, but lamina very broad and arms closed. Scent bag is larger than in most *Pieris* species, but not as large as in *P. melete*.

Male genitalia (Fig. 5): Tegumen and uncus bent down. Valva projecting.

Etymology

The subspecific name "*koidesia*" is derived from Mr Yuichi Koide who provided us with the specimens for the present study.

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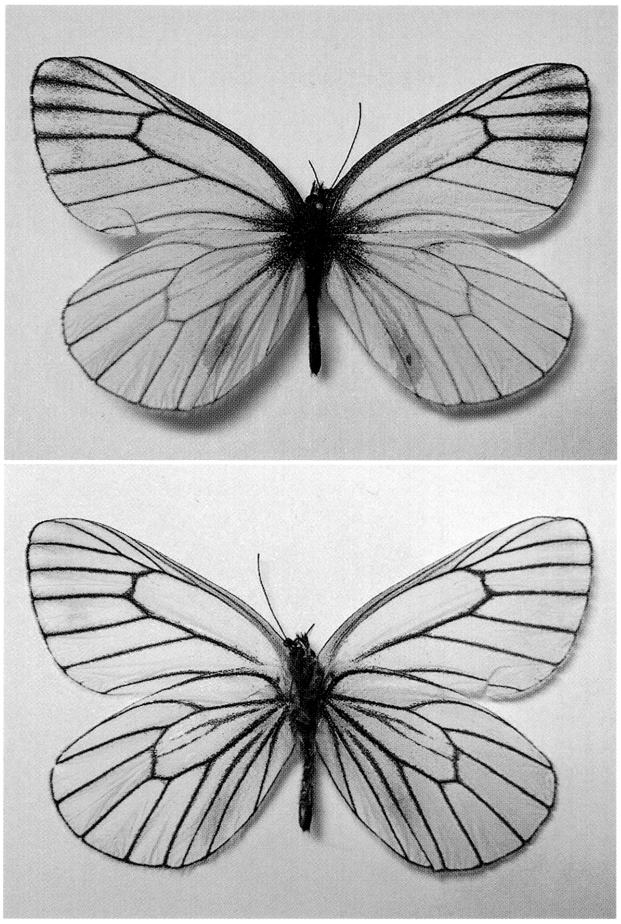

Fig. 1. *Pieris shangrilla koidesia* **ssp. nov.** Holotype ♂.

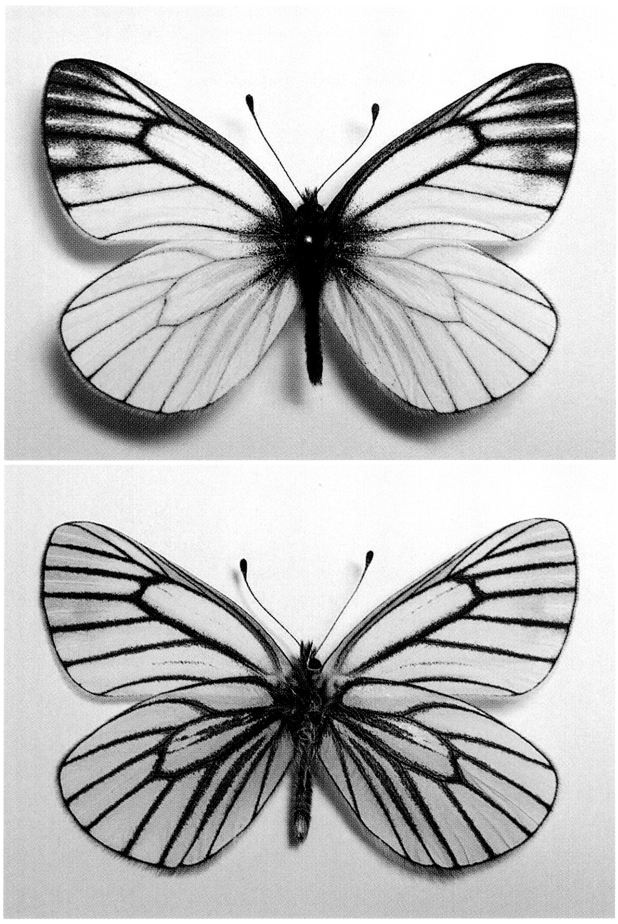

Fig. 2. *Pieris shangrilla shangrilla*, Holotype ♂.

Remarks

After detailed observation of the wing markings, androconia and male genitalia, some distinct morphological characteristics in comparison with nominotypical ssp. *shangrilla* were found as follows:

1) Wing markings: ssp. *koidesia* has lighter markings. All veins are less suffused and forewing submarginal band is very faint. Distinct external characteristics of ssp. *koidesia* from ssp. *shangrilla* are similar to those of **P. davidis diluta* Verity, 1911 from **P. davidis davidis* (Figs 1–3).
2) Androconia: Androconia scales are laid on the male's forewing cell and emit a distinct sexual odor. It consists of a lamina and a scent-bag connecting to the center of the lamina by a slender pipe of vein. *Pieris* species have long and pyriform lamina in general. We observed three specimens of both ssp. *koidesia* and ssp. *shangrilla* and compared their androconia. The lamina of ssp. *koidesia* is similar to that of ssp. *shangrilla*, but the bottom is closed, while in ssp. *shangrilla* it is widely opened. The scent bag is as large as in ssp. *shangrilla* (Fig. 4).
3) Male genitalia: Tegumen and uncus bent down. Valva projecting (Fig. 5).

Habitat and distribution

The type locality of *P. shangrilla koidesia* is Tianquan-xian in Sichuan Province of China, 400km north of the type locality of ssp. *shangrilla*. The separation of the two areas is greater than suggested by the horizontal distance in Tibet. The two areas are separated by Mts. Daxue shan and Mt. Kongga shan (Minja Konka: alt. 7,556 m). Four specimens were collected at Jiuzhaigou, and five other specimens were collected along the road between Pingwu and Nanping. We consider that ssp. *koidesia* occurs in the broad area of Sichuan province from Tianquan-xian to Jiuzhaigou, while ssp. *shangrilla* is seen only in the upper valley of the Salween, Mekong and Yangtze Rivers in North Yunnan (Fig. 6). Since there is no record of *P. shangrilla* from an altitude greater than 3,100 m, their

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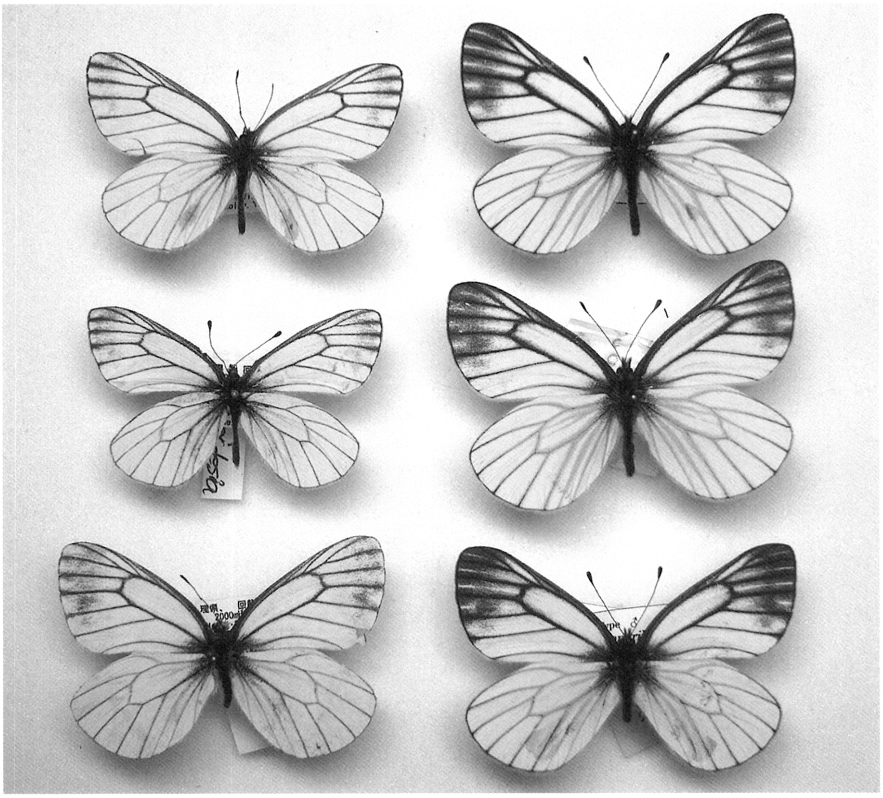
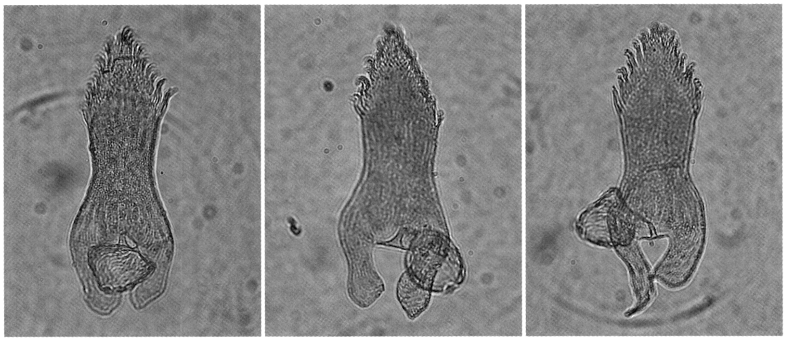
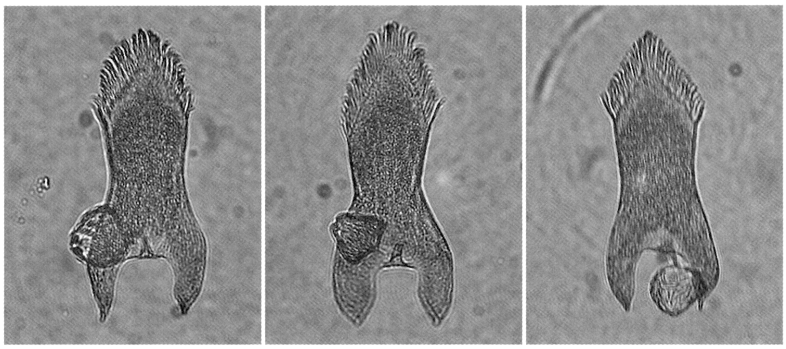


Fig. 3. ssp. *koidesia* ♂ (L) and ssp. *shangrilla* ♂ (R).



ssp. *koidesia*



ssp. *shangrilla*

Fig. 4. Androconia of ssp. *koidesia* and ssp. *shangrilla*.

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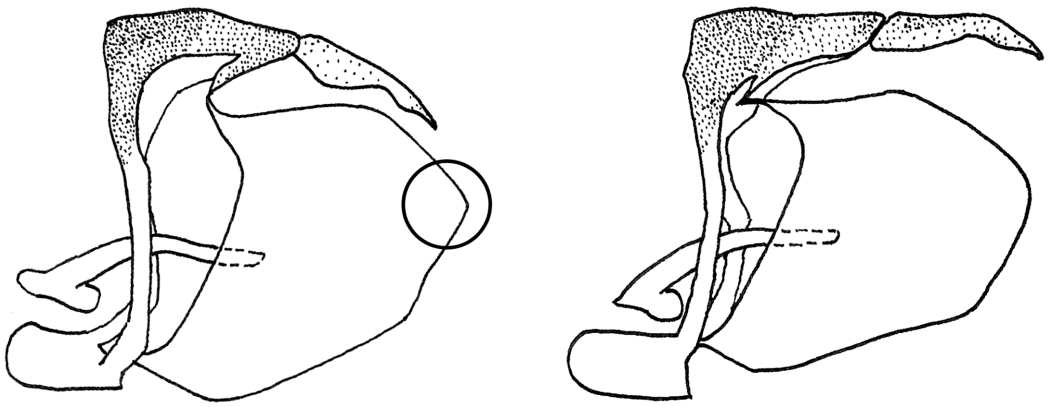

ssp. *koidesia* ssp. *shangrilla*

Fig. 5. Male genitalia of ssp. *koidesia* (L) and ssp. *shangrilla* (R).

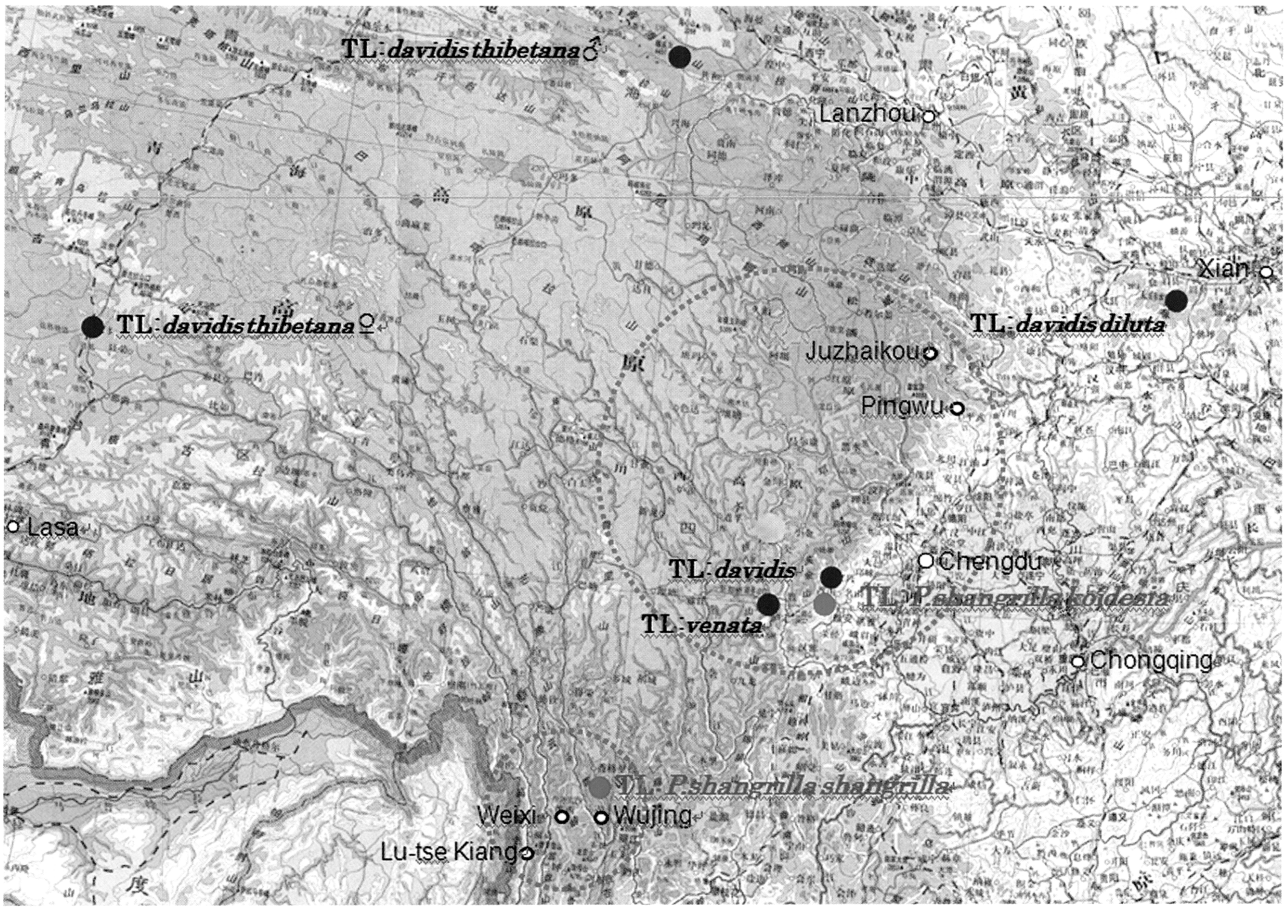

Fig. 6. Type localities of *P. shangrilla shangrilla*, ssp. *koidesia* and **P. davidis* & its related taxa.

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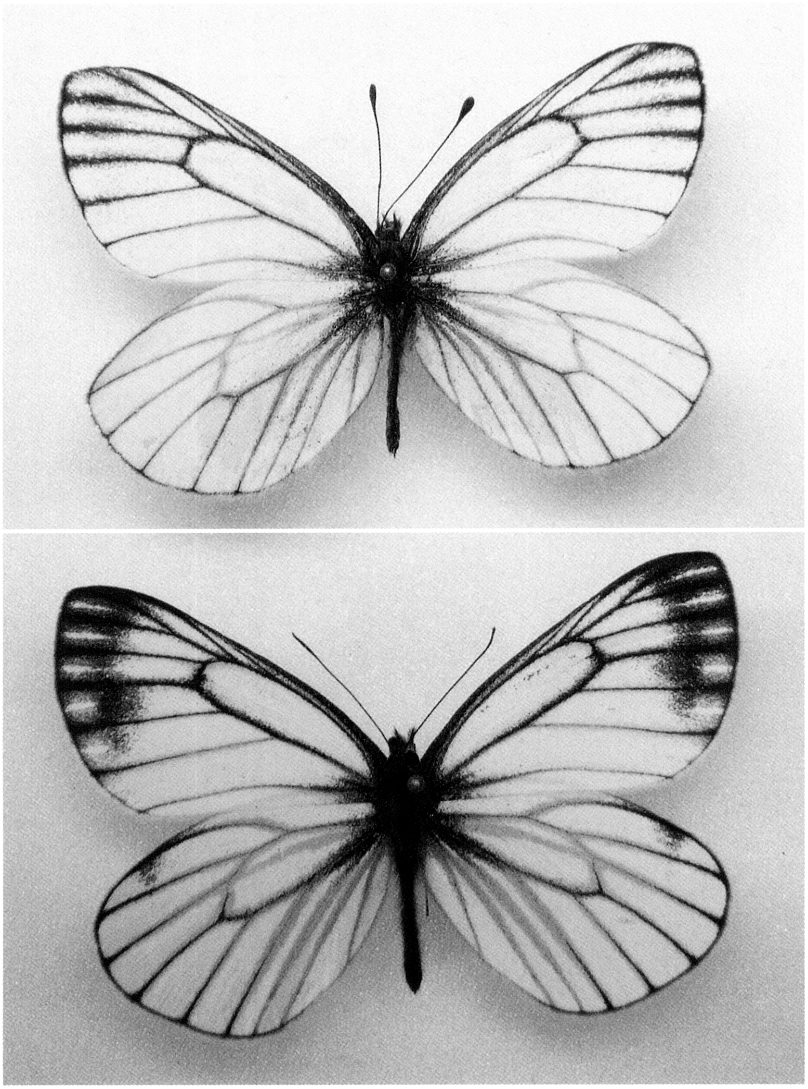

Fig. 7. *Pieris shangrilla koidesia* ♂ (UP) and **Pieris davidis* ♂ (DN) from Jiuzaigou, Sichuan.

habitats must be isolated by the high Tibetan mountains, and a distinct population must have evolved separately within an isolated habitat. On the other hand, **P. davidis* and its related taxa are commonly recorded at the altitudes higher than 4,000 m and can extend their habitat (Fig. 6). In fact, both **P. davidis* and *P. shangrilla koidesia* fly together in Tianquan-xian and Jiuzhaigou. The morphological characteristics of **P. davidis* in Yunnan and Sichuan are uniform, while those of *P. shangrilla* are distinctly different (Fig. 7).

Notes

*: We treat *Sinopieris davidis* as *Pieris davidis* in this paper, as indicated by Tadokoro *et al*. (2013).

Conclusion

Based on the distinct morphological characteristics and geographical isolation stated above, we describe this butterfly as a new subspecies of *Pieris shangrilla*, "*Pieris shangrilla koidesia* Tadokoro, Wang & Bozano, 2013". The Japanese name is "コイデシャングリラシロチョウ" and the Chinese name is "香格里拉粉蝶四川亚种".

Acknowledgments

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References

Oberthür, M., 1876. Etud. d'Entom. ii. p. 18, pl. i. fig. 5.

Tadokoro, T., T. Shinkawa and M. Wang, 2013. Description of a new species of the genus *Pieris* (Lepidoptera, Pieridae). *Lepid. Sci.* **64** (1): 1–9.

Verity, R., 1905-1911, Rhopalocera Palaearctica, Priv. Publ., Florence.

摘　要

中国四川省産*Pieris shangrilla*の新亜種記載（田所輝夫・王敏・Gian Cristoforo BOZANO）

小出雄一氏が所蔵する蝶コレクションの中に，*Pieris shangrilla*と思われる3個体の標本を発見した．同氏が四川省天全県の回龍溝（標高2,000 m）で2005年6月に採集した標本である．その後我々自身の標本の中からも，これら3♂と同じ形態的特徴を有する9♂の標本を発見した．それらは九賽溝（標高2,200–2,800 m）及び平武の近郊（標高1,700–2,800 m）で，1988年から2004年にかけて採集された個体群であった．班紋・発香鱗・♂交尾器及び採集地を精査した結果，これらの個体群には共通して雲南省をタイプ産地とする*Pieris shangrilla*の別亜種として記載するに足る十分な形態的特徴及び地理的地形的隔絶が認められたため，新亜種*Pieris shangrilla koidesia*（和名：コイデシャングリラシロチョウ，中国名：香格里拉粉蝶四川亚种）を記載した．新亜種ssp. *koidesia*は，名義タイプ亜種 (ssp. *shangrilla*) に比較すると同種の特徴の一つである前翅外縁部の黒帯が極めて薄く退化した集団である．ホロタイプ標本は華南農業大学に保管されパラタイプ標本は，東京大学の大学博物館及びミラノ，ロンドンの自然史博物館にそれぞれ保管される予定．

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